AMENDMENTS TO THE CLAIMS

Listing of Claims:

This Listing of Claims will replace all prior versions, and listings, of claims in the application:

1. (Previously Presented) An isolated population of labeled oligonucleotide probes, each labeled oligonucleotide probe comprising an oligonucleotide associated with a series of detectably distinguishable signal molecules, the number and type of signal molecules identifying the nucleotide sequence of the probe, the number of probes in the population exceeding the number of unique signal molecules, wherein the type of nucleotide at each position in at least one of the labeled oligonucleotide probes is identified by an intensity of at least one of the unique signal molecules.

2. (Original) The population of labeled oligonucleotide probes of claim 1, wherein each unique signal molecule is present up to 4 times per labeled oligonucleotide probe.

3. (Canceled)

4. (Canceled)

5. (Original) The population of labeled oligonucleotide probes of claim 1, wherein each labeled oligonucleotide probe comprises an intensity reference signal molecule.

6. (Original) The population of labeled oligonucleotide probes of claim 1, wherein each oligonucleotide is an identical length of about 10 to 50 nucleotides.

7. (Original) The population of labeled oligonucleotide probes of claim 1, wherein the signal molecules are Raman labels.

8. (Previously Presented) The population of labeled oligonucleotide probes of claim 7, wherein the series of signal molecules comprise a polymethine dye or a signal molecule selected from the group consisting of 2-Aminopurine, 2-Fluoroadenine, 4-Amino-pyrazolo[3,4-d]pyrimidine, 4-Pyridinecarboxaldoxime, 8-Azaadenine, Adenine, 4-Amino-3,5-di-2-pyridyl-4H-1,2,4-triazole, 6-(g,g-Dimethylallylamino)purine, Kinetin, N6-Benzoyladenine, Zeatin, 4-Amino-2,1,3-benzothiadia- zole, Acriflavine, Basic blue 3, Methylene Blue, 2-Mercapto-benzimidazole, 4-Amino-6-mercaptopyrazolo[3,4-d]pyrimidine, 6-Mercaptopurine, 8-Mercaptoadenine (adenine thiol), 9-Aminoacridine, Cyanine dyes, Ethidium bromide, Fluorescein, Rhodamine Green, and Rhodamine-6G.

9. (Original) The population of labeled oligonucleotide probes of claim 1, wherein the signal molecules are fluorescent labels or quantum dots.

10. (Original) The population of labeled oligonucleotide probes of claim 1, wherein the signal molecules are a series of nanotags.

11. (Withdrawn) A method to identify a nucleotide sequence of a target nucleic acid, the method comprising:

a) contacting a target nucleic acid with a population of labeled oligonucleotide probes, each labeled oligonucleotide probe comprising a series of detectably distinguishable signal molecules associated with an oligonucleotide, the oligonucleotide being identifiable by the number and type of associated signal molecules, wherein the number of probes exceeds the number of unique signal molecules;

b) separating bound oligonucleotide probes from unbound labeled oligonucleotide probes;

c) detecting a signal generated from the bound labeled oligonucleotide probes; and

d) decomposing the signal to identify the number and type of signal molecules in the bound labeled oligonucleotide probes, thereby identifying a nucleotide sequence of the target nucleic acid.

12. (Withdrawn) The method of claim 11, wherein each unique signal molecule is present up to 4 times per labeled oligonucleotide probe.

13. (Withdrawn) The method of claim 12, wherein the number of unique signal molecules is equal to the number of nucleotides of the labeled oligonucleotide probe.

14. (Withdrawn) The method of claim 13, wherein the nucleotide occurrence of each nucleotide position of the labeled oligonucleotide probe is identified by a number of copies of a unique signal molecule.

15. (Withdrawn) The method of claim 11, wherein each labeled oligonucleotide probe comprises an intensity reference signal molecule.

16. (Withdrawn) The method of claim 11, wherein each oligonucleotide is an identical length of about 10 to 50 nucleotides.

17. (Withdrawn) The method of claim 11, wherein the population of labeled oligonucleotide probes comprises all possible sequence combinations of an oligonucleotide of the identical length.

18. (Withdrawn) The method of claim 11, wherein the signal molecules are Raman labels.

19. (Withdrawn) The method of claim 18, wherein the series of signal molecules comprise a polymethine dye or a signal molecule of Table 1.

20. (Withdrawn) The method of claim 11, wherein the signal molecules are fluorescent labels or quantum dots.

21. (Withdrawn) The method of claim 11, wherein the signal molecules are a series of nanotags.

22. (Withdrawn) The method of claim 11, further comprising contacting the target nucleic acid, or a fragment thereof, with a population of capture oligonucleotide probes bound to a substrate at a series of spot locations before contacting the target nucleic acid with the population of labeled oligonucleotide probes.

23. (Withdrawn) The method of claim 22, further comprising ligating labeled oligonucleotide probes with capture oligonucleotide probes that bind adjacent target segments of the target nucleic acid.

24. (Previously Presented) A reaction mixture, comprising a target polynucleotide and an isolated population of labeled probes, wherein each labeled probe comprises an oligonucleotide associated with a series of detectably distinguishable signal molecules, the nucleotide sequence of each oligonucleotide being represented by the number and type of signal molecules associated with the oligonucleotide, wherein the number of probes exceeds the number of unique signal molecules, wherein the type of nucleotide at each position in at least one of the labeled probes is identified by an intensity of at least one of the unique signal molecules.

25. (Original) The reaction mixture of claim 24, wherein each unique signal molecule is present up to 4 times per labeled oligonucleotide probe.

26. (Canceled)

27. (Canceled)

28. (Original) The reaction mixture of claim 24, wherein each labeled oligonucleotide probe comprises an intensity reference signal molecule.

29. (Original) The reaction mixture of claim 24, wherein each oligonucleotide is an identical length of about 10 to 50 nucleotides.

30. (Original) The reaction mixture of claim 24, wherein the population of labeled oligonucleotide probes comprises all possible sequence combinations of an oligonucleotide of the identical length.

31. (Original) The reaction mixture of claim 24, wherein the signal molecules are Raman labels.

32. (Previously Presented) The reaction mixture of claim 31, wherein the series of signal molecules comprise a polymethine dye or a signal molecule selected from the group consisting of 2-Aminopurine, 2-Fluoroadenine, 4-Amino-pyrazolo[3,4-d]pyrimidine, 4-Pyridinecarboxaldoxime, 8-Azaadenine, Adenine, 4-Amino-3,5-di-2-pyridyl-4H-1,2,4-triazole, 6-(g,g-Dimethylallylamino)purine, Kinetin, N6-Benzoyladenine, Zeatin, 4-Amino-2,1,3-benzothiadiazole, Acriflavine, Basic blue 3, Methylene Blue, 2-Mercapto-benzimidazole, 4-Amino-6-

mercaptopyrazolo[3,4-d]pyrimidine, 6-Mercaptopurine, 8-Mercaptoadenine (adenine thiol), 9-Aminoacridine, Cyanine dyes, Ethidium bromide, Fluorescein, Rhodamine Green, and Rhodamine-6G.

33. (Original) The reaction mixture of claim 24, wherein the signal molecules are fluorescent labels.

34. (Original) The reaction mixture of claim 24, wherein the signal molecules are a series of nanotags.

35. (New) The population of labeled oligonucleotide probes of claim 1, wherein a location of a peak in a response spectra indicates the presence of a particular labeled oligonucleotide probe while the size of the peak is proportional to the number of the particular labeled oligonucleotide probe.

36. (New) The reaction mixture of claim 24, wherein a location of a peak in a response spectra indicates the presence of a particular labeled oligonucleotide probe while the size of the peak is proportional to the number of the particular labeled oligonucleotide probe.

37. (New) The population of labeled oligonucleotide probes of claim 1, wherein each signal molecule is assigned to encode a subunit of a template polynucleotide.

38. (New) The reaction mixture of claim 24, wherein each signal molecule is assigned to encode a subunit of a template polynucleotide.